CLAIMS

1. A method for diagnosing a granulocyte disorder comprising:

detecting in a biological sample from a subject a level of expression of one or more granulocyte-selective markers,

comparing the level of expression of each of the one or more granulocyte-selective markers with a reference level of expression, wherein a statistically significant difference between the level of expression of at least one granulocyte-selective marker and an expected level of expression for the at least one granulocyte-selective marker is indicative of a granulocyte disorder in the subject.

2. The method of claim 1, wherein the reference level of expression for a granulocyte-selective marker is a normal level of expression of the granulocyte-selective marker in a normal granulocyte.

3. The method of claim 1, wherein the biological sample is a blood sample.

4. The method of claim 1, wherein the biological sample is a tissue sample.

5. The method of claim 1, wherein the level of expression of each of the one or more granulocyte-selective markers is determined by determining an amount of an mRNA in the biological sample corresponding to each of the one or more granulocyte-selective markers.

6 The method of claim 5, wherein the method of determining the amount of mRNA comprises reverse transcription polymerase chain reaction (RT-PCR) amplification.

7. The method of claim 1, wherein the level of expression of each of the one or more granulocyte-selective markers is determined by determining an amount of a protein in the biological sample corresponding to each of the one or more granulocyte-selective markers.

8 The method of claim 7, wherein the method of determining the amount of a protein that corresponds to a granulocyte-selective marker comprises contacting the biological sample with an antibody that binds to the protein.

9. The method of claim 1, wherein a higher level of expression of at least one of the one or more granulocyte-selective markers in the biological sample compared to the expected level of expression for the at least one granulocyte-selective marker is indicative of the granulocyte disorder.

10. The method of claim 1, wherein a lower level of expression of at least one of the one or more granulocyte-selective markers in the biological sample compared to the expected level of expression for the at least one granulocyte-selective marker is indicative of the granulocyte disorder.

11. The method of claim 1, wherein the granulocyte disorder comprises an abnormally high number of one or more types of granulocyte in the biological sample.

12. The method of claim 1, wherein the granulocyte disorder comprises an abnormally low number of one or more types of granulocyte in the biological sample.

13. The method of claim 1, wherein the granulocyte disorder comprises an abnormal pattern of expression of one or more granulocyte selective markers in one or more types of granulocyte in the biological sample.

14. A method for diagnosing a non-neutrophil granulocyte disorder or mast cell disorder comprising:

detecting in a biological sample from a subject a level of expression of one or more non-neutrophil granulocyte or mast cell selective markers,

comparing the level of expression of each of the one or more non-neutrophil granulocyte or mast cell selective markers with a reference level of expression, wherein a statistically significant difference between the level of expression of at least one non-

neutrophil granulocyte or mast cell selective marker and an expected level of expression for the at least one non-neutrophil granulocyte or mast cell selective marker is indicative of a non-neutrophil granulocyte disorder or mast cell disorder in the subject.

15. The method of claim 14, wherein the non-neutrophil granulocyte disorder is a basophil disorder.

16. The method of claim 15, wherein the basophil disorder is a basophil-associated tumor or cancer.

17. The method of claim 14, wherein the non-neutrophil granulocyte disorder is an eosinophil disorder.

18 The method of claim 17, wherein the eosinophil disorder is an eosinophil-associated tumor or cancer.

19. The method of claim 14, wherein the mast cell disorder is a mast cell-associated tumor or cancer.

20. The method of claim 14, wherein the biological sample is a blood sample.

21. The method of claim 14, wherein the biological sample is a tissue sample.

22. The method of claim 14, wherein the level of expression is determined by determining an amount of an mRNA in the biological sample corresponding to each of the one or more granulocyte-selective markers.

23. The method of claim 22, wherein the method of determining the amount of mRNA comprises reverse transcription polymerase chain reaction (RT-PCR) amplification.

24. The method of claim 14, wherein the level of expression is determined by determining an amount of a protein in the biological sample corresponding to each of the one or more non-neutrophil granulocyte or mast cell-selective markers.

25 The method of claim 24, wherein the method of determining the amount of a protein that corresponds to a non-neutrophil granulocyte or mast cell-selective marker comprises contacting the biological sample with an antibody that binds to the protein.

26. The method of claim 14, wherein a higher level of expression of one or more non-neutrophil granulocyte or mast cell -selective marker in the biological sample compared with the control level of expression of the one or more non-neutrophil granulocyte or mast cell -selective marker is diagnostic of the non-neutrophil granulocyte disorder or mast cell disorder.

27. The method of claim 14, wherein a lower level of expression of one or more non-neutrophil granulocyte or mast cell -selective marker in the biological sample compared with the control level of expression of the one or more non-neutrophil granulocyte or mast cell -selective marker is diagnostic of the non-neutrophil granulocyte disorder or mast cell disorder.

28. A method for determining onset, progression, or regression, of a granulocyte disorder in a subject, comprising:

detecting in a first biological sample comprising blood from a subject a first level of expression of one or more granulocyte-selective markers,

detecting in a second biological sample comprising blood and obtained from the subject at a time later than the first biological sample, a second level of expression of the one or more granulocyte-selective markers,

comparing the first level of expression with the second level of expression, wherein a statistically significant difference between the first and second levels is an indication of onset, progression, or regression of the granulocyte disorder.

29. The method of claim 28, wherein the biological sample is a blood sample.

30. The method of claim 28, wherein the biological sample is a tissue sample.

31. The method of claim 28, wherein the level of expression is determined by determining an amount of an mRNA in the biological sample corresponding to each of the one or more granulocyte-selective markers.

32. The method of claim 31, wherein the method of determining the amount of mRNA comprises reverse transcription polymerase chain reaction (RT-PCR) amplification.

33. The method of claim 28, wherein the level of expression is determined by determining an amount of a protein in the biological sample corresponding to each of the one or more granulocyte-selective markers.

34 The method of claim 33, wherein the method of determining the amount of a protein that corresponds to a granulocyte-selective marker comprises contacting the biological sample with an antibody that binds to the protein.

35. A method of selecting a course of treatment for a subject having or suspected of having a granulocyte disorder, comprising:

detecting in a biological sample from a subject a level of expression of one or more granulocyte-selective markers,

comparing the level of expression of the one or more granulocyte-selective markers to a reference level of expression,

determining the status of the granulocyte disorder of the subject based on the difference in the level of expression of one or more granulocyte-selective marker in the sample compared to the reference level of expression, and

selecting a course of treatment for the subject appropriate to the status of the granulocyte disorder of the subject.

36. The method of claim 35, wherein the biological sample is a blood sample.

37. The method of claim 35, wherein the biological sample is a tissue sample.

38. The method of claim 35, wherein the level of expression is determined by determining an amount of an mRNA in the biological sample corresponding to each of the one or more granulocyte-selective markers.

39. The method of claim 38, wherein the method of determining the amount of mRNA comprises reverse transcription polymerase chain reaction (RT-PCR) amplification.

40. The method of claim 35, wherein the level of expression is determined by determining an amount of a protein in the biological sample corresponding to each of the one or more granulocyte-selective markers.

41 The method of claim 40, wherein the method of determining the amount of a protein that corresponds to a granulocyte-selective marker comprises contacting the biological sample with an antibody that binds to the protein.

42. A method for monitoring responses to treatment in a subject with a granulocyte disorder, comprising:

detecting in a biological sample from a subject that has received treatment for the granulocyte disorder, a level of expression of one or more granulocyte-selective markers,

comparing the level of expression of the one or more granulocyte-selective marker with a reference level of expression, wherein a change in the level of expression of one or more of the granulocyte-selective markers in the biological sample relative to the reference level of expression indicates that the subject is responding to the treatment for the granulocyte disorder.

43. The method of claim 42, wherein the biological sample is a blood sample.

44. The method of claim 42, wherein the biological sample is a tissue sample.

45. The method of claim 42, wherein the level of expression is determined by determining an amount of an mRNA in the biological sample corresponding to each of the one or more granulocyte-selective markers.

46. The method of claim 45, wherein the method of determining the amount of mRNA comprises reverse transcription polymerase chain reaction (RT-PCR) amplification.

47. The method of claim 42, wherein the level of expression is determined by determining an amount of a protein in the biological sample corresponding to each of the one or more granulocyte-selective markers.

48. The method of claim 47, wherein the method of determining the amount of a protein that corresponds to a granulocyte-selective marker comprises contacting the biological sample with an antibody that binds to the protein.

49. An assay for identifying a compound that alters at least one physiological property of a granulocyte comprising:

contacting a granulocyte with a candidate compound that interacts with a granulocyte-selective marker,

determining at least one physiological property of the granulocyte after contact with the candidate compound,

comparing the at least one physiological property to one at least one reference property to determine whether the candidate compound alters at least one physiological property of the granulocyte.

50. The method of claim 49, wherein the granulocyte is a neutrophil.

51. The method of claim 49, wherein the granulocyte is an eosinophil.

52. The method of claim 49, wherein the granulocyte is a basophil.

53. The method of claim 49, further comprising the step of comparing the effect the candidate compound has on a second cell type to determine whether the candidate compound has a cell-type selective effect on the granulocyte.

54. The method of claim 53, wherein the second cell type is another granulocyte cell type.

55. The method of claim 53, wherein the second cell type is a non-granulocyte cell type.

56. The method of claim 49, wherein the at least one physiological property comprises the expression level of one or more granulocyte-selective markers.

57. The method of claim 49, wherein the at least one physiological property comprises the growth rate of the granulocyte.

58. The method of claim 49, wherein the at least one physiological property comprises the proliferation rate of the granulocyte.

59. The method of claim 49, wherein the candidate compound kills the granulocyte.

60. The method of claim 50, wherein the candidate compound selectively kills the granulocyte.

61. A method of treating a granulocyte-associated disease, the method comprising administering to a subject having a granulocyte-associated disease a compound that interacts with a granulocyte-selective marker in an amount sufficient to treat the granulocyte-associated disease.

62. A method of treating a granulocyte-associated disease, the method comprising modulating the activity or expression of a granulocyte-selective marker thereby to treat the granulocyte-associated disease.

63. The method of claim 61 or 62, wherein the granulocyte is a neutrophil.

64. The method of claim 61 or 62, wherein the granulocyte is an eosinophil.

65. The method of claim 61 or 62, wherein the granulocyte is a basophil.

66. A method of treating a mast cell-associated disease, the method comprising administering to a subject having a mast cell-associated disease a compound that interacts with a mast cell-selective marker in an amount sufficient to treat the mast cell-associated disease.

67. A method of treating a mast cell-associated disease, the method comprising modulating the activity or expression of a mast cell-selective marker thereby to treat the mast cell-associated disease.

68. The method of claim 61, wherein the compound was identified in a screen for a compound that alters at least one physiological property of the granulocyte.

69. The method of claim 66, wherein the compound was identified in a screen for a compound that alters at least one physiological property of the mast cell.

70. A composition comprising a compound that alters a physiological property of a granulocyte, wherein the compound was identified by screening compounds that interact with a granulocyte-selective marker.

71. A composition comprising a compound that alters a physiological property of a mast cell, wherein the compound was identified by screening compounds that interact with a mast cell-selective marker.